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10/080,915	02/22/2002	Randy Harris	291958173US1	7799

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 08/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/080,915

Applicant(s)

HARRIS ET AL.

Examiner

Harry D. Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 and 57-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 and 57-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Status

1. The objection to the specification has been withdrawn in view of Applicant's correction.
2. The objection to claim 13 has been withdrawn in view of Applicant's correction.
3. The double patenting rejection of claims over the claims of 10/080,914 has been withdrawn in view of the terminal disclaimer filed on 22 June 2005.
4. The rejections under 35 USC 102 and 103 based on Thompson et al and Curtis et al have been withdrawn in view of Applicant's amendment to claims 1, 21 and 28 inserting additional subject matter.
5. However, new grounds of rejection are presented below based on the new claim limitations and the absence of the limitation that the processing stations be manually accessible.

Terminal Disclaimer

6. The terminal disclaimer filed on 22 June 2005 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on Application Number 10/080,914 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 12, 13, 16, 17, 21, 25, 28 and 57-60 are rejected under 35 U.S.C.

103(a) as being unpatentable over Harada et al (US 5,700,127) in view of Kinnard et al (US 6,663,333).

Harada et al teach (see figure 1) an apparatus for processing microelectronic workpieces including a plurality of processing stations (34 - 39), an input/output station (2) configured to support at least one microelectronic workpiece for automatic transfer to and from the processing stations, and a transfer device (10) positioned proximate to the input/output station and the processing stations, wherein the transfer device was automatically movable transfer microelectronic workpieces between the input/output station and the processing stations, the transfer device being positioned to release the microelectronic workpieces for processing at the processing stations.

Thus, Harada et al fail to teach that the transfer device included first and second end effectors, each being rotatable relative to the other about a common axis.

Kinnard et al teach (see figures 6A-11 and col. 5, lines 30-34) teach a dual end effector wafer transport mechanism containing two end effectors each being rotatable relative to each other about a common axis. The dual end effector has the advantage of increasing transport mechanism throughput, thereby speeding microelectronic workpiece processing.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the dual end effector as taught by Kinnard et al in the apparatus of Harada et al because the dual end effector increased microelectronic workpiece processing speed.

Regarding claims 21 and 28, Harada et al further teach (see paragraph spanning cols. 4 and 5) that the processing stations include at least one station configured to remove material from the microelectronic workpiece and at least one station configured to heat (bake) the microelectronic workpiece. The baking unit would inherently be considered to include a heat transfer unit proximate to the thermal processing space to elevate the temperature of the microelectronic workpiece.

Regarding claim 12, Harada et al do not expressly disclose that the apparatus includes an enclosure around the processing stations for restricting user access to the transfer device. However, it was conventional in the art to conduct microelectronic processing in a clean room environment (see e.g.-Curtis et al) in order to prevent dust and other impurities from affecting the workpiece surface. Therefore, it would have been obvious to one of ordinary skill in the art to have added an enclosure for closing off the area surrounding the processing stations so that the processing stations could be operated in a clean room environment.

Regarding claims 13 and 25, the processing stations of Harada et al were (see figure 1) arranged along a first line and the transfer device included a robot moving along a second line parallel to the first line. Harada et al do not expressly disclose that the apparatus includes an enclosure around the processing stations for restricting user access to the transfer device. However, it was conventional in the art to conduct microelectronic processing in a clean room environment (see e.g.-Curtis et al) in order to prevent dust and other impurities from affecting the workpiece surface. Therefore, it would have been obvious to one of ordinary skill in the art to have added an enclosure

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for closing off the area surrounding the processing stations so that the processing stations could be operated in a clean room environment. Since the robot transfer device would need access to the input/output station, the enclosure would have an aperture accessible to the robot. It would have been obvious to one of ordinary skill in the art to have made each of the stations manually accessible because it would have been necessary to be able to perform maintenance on the processing stations. Thus, it would have been desirable to have added a second closable aperture to provide manual access to the processing stations.

Regarding claims 16, 17 and 27, Harada et al do not expressly disclose that the apparatus includes an enclosure around the processing stations for restricting user access to the transfer device. However, it was conventional in the art to conduct microelectronic processing in a clean room environment (see e.g.-Curtis et al) in order to prevent dust and other impurities from affecting the workpiece surface. Therefore, it would have been obvious to one of ordinary skill in the art to have added an enclosure for closing off the area surrounding the processing stations so that the processing stations could be operated in a clean room environment. It would have been obvious to one of ordinary skill in the art to have made each of the stations manually accessible because it would have been necessary to be able to perform maintenance on the processing stations. Thus, it would have been desirable to have added closable apertures to provide manual access to the processing stations on either side of the apparatus. The other two sides of the apparatus would not require apertures for

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accessing the processing stations since adequate access would have been provided on the first two sides.

Regarding claim 57, Harada et al further teach (see paragraph spanning cols. 4 and 5) that the processing stations include at least one station configured to apply material to the microelectronic workpiece.

Regarding claim 58, the transfer devices of both Harada et al and Kinnard et al included a robot having a projection. The projection of Kinnard et al carried the first and second end effectors and the effectors were rotatable relative to the projection about a common axis. Kinnard et al do not teach that the projection was "eccentric" in shape. However, changes in shape have been held to be obvious absent evidence of unexpected results. See MPEP 2144.04.IV.B.

Regarding claim 59, the transfer device of Kinnard et al included a lift (204, 208 and 206) positioned to move up and down, an "arm" (200) carried by the lift being rotatable relative to the lift around a vertical axis, wherein the first and second end effector were both carried by the "arm" and were rotatable relative to a common axis.

Regarding claim 60, the apparatus of Harada et al included (see figure 2) processing stations at a first plane and a transfer device including a moveable robot in a second plane located below the first plane.

9. Claims 2-5, 7, 9-11, 18-20, 22, 23 and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,700,127) in view of Kinnard et al (US 6,663,333) as applied to claims above and further in view of Applicant's admission of prior art.

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The teachings of Harada et al and Kinnard et al are described above.

(All references to paragraph numbers in the present application come from the PGPub of this application, 2003/0159921).

Harada et al teach (see paragraph spanning cols. 4 and 5) that the processing stations are conventional in the art for processing the microelectronic workpieces.

Hence, Harada et al does not teach the details of the conventional processing stations.

However, Applicant admits as prior art (see paragraphs 81, 89, 96, 105, 110, 121 and 134) that certain aspects of the processing stations were known in the prior art from various disclosed references. This subject matter corresponds to the inventions shown in Figures 9, 12-14, 16 and 18. Each of these conventional processing stations corresponds to claims 2-5, 7 and 9-11.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the apparatus of Thompson et al to use the conventional processing stations disclosed by Applicant because the conventional processing stations allow any desirable process to be carried out upon the semiconductor wafers, such as electroplating, removal of material, metrology (testing of certain properties) and thermal processing.

Regarding claim 18, Harada et al teach (see paragraph spanning cols. 4 and 5) the apparatus included a (jet) spray station as claimed. Harada et al do not teach the details of adding an electrodeposition station as claimed. However, Applicant admits that such an electrodeposition station was known in the prior art (see paragraph 105).

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Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the apparatus of Harada et al to have used the conventional processing station disclosed by Applicant because the conventional processing station allowed any desirable process to be carried out upon the semiconductor wafers, such as electroplating.

Regarding claim 19, it would have been obvious to one of ordinary skill in the art to have adapted the apparatus of Harada et al to use the conventional processing stations disclosed by Applicant because the conventional processing stations allow any desirable process to be carried out upon the semiconductor wafers, such as electroplating (to enhance seed layer and to apply a blanket layer), removal of material and thermal processing.

Regarding claim 20, as above, the apparatus of Harada et al includes a (jet) spray station as claimed. It would have been obvious to one of ordinary skill in the art to have adapted the apparatus of Harada et al to have used the conventional processing stations disclosed by Applicant because the conventional processing stations allow any desirable process to be carried out upon the semiconductor wafers, such as electrophoretic deposition and thermal processing.

Regarding claims 22 and 23, the admitted prior art material removing station meets all of the claimed structural limitations. It would have been obvious to one of ordinary skill in the art to have adapted the apparatus of Harada et al to have used the conventional processing stations disclosed by Applicant because the conventional

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processing stations allow any desirable process to be carried out upon the semiconductor wafers, such as removal of material.

Regarding claims 29 and 30, Harada et al fail to teach the specific details of the thermal processing station as claimed. However, the details of the thermal processing station were admitted by Applicant to be prior art (see paragraph 134). Therefore, the prior art meets the claimed structural limitations.

Regarding claim 31, the processing stations of Harada et al were (see figure 1) arranged along a first line and the transfer device included a robot moving along a second line parallel to the first line. Harada et al do not expressly disclose that the apparatus includes an enclosure around the processing stations for restricting user access to the transfer device. However, it was conventional in the art to conduct microelectronic processing in a clean room environment (see e.g.-Curtis et al) in order to prevent dust and other impurities from affecting the workpiece surface. Therefore, it would have been obvious to one of ordinary skill in the art to have added an enclosure for closing off the area surrounding the processing stations so that the processing stations could be operated in a clean room environment. Since the robot transfer device would need access to the input/output station, the enclosure would have an aperture accessible to the robot. It would have been obvious to one of ordinary skill in the art to have made each of the stations manually accessible because it would have been necessary to be able to perform maintenance on the processing stations. Thus, it would have been desirable to have added a second closable aperture to provide manual access to the processing stations.

Regarding claim 32, Harada et al do not expressly disclose that the apparatus includes an enclosure around the processing stations for restricting user access to the transfer device. However, it was conventional in the art to conduct microelectronic processing in a clean room environment (see e.g.-Curtis et al) in order to prevent dust and other impurities from affecting the workpiece surface. Therefore, it would have been obvious to one of ordinary skill in the art to have added an enclosure for closing off the area surrounding the processing stations so that the processing stations could be operated in a clean room environment. It would have been obvious to one of ordinary skill in the art to have made each of the stations manually accessible because it would have been necessary to be able to perform maintenance on the processing stations. Thus, it would have been desirable to have added closable apertures to provide manual access to the processing stations on either side of the apparatus.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,700,127) in view of Kinnard et al (US 6,663,333) as applied to claims above and further in view of Hongo et al (US 6,716,330).

The teachings of Harada et al and Kinnard et al are described above.

Harada et al teach (see paragraph spanning cols. 4 and 5) that the processing stations other than the disclosed reactor are conventional in the art for applying complementary processing steps on the microelectronic workpieces.

Hence, Harada et al does not teach the details of a conventional processing station being an electroless plating station.

However, Hongo et al teach (see abstract, figures 2 and 3) an electroless plating station for a semiconductor wafer (W) including a first vessel configured to provide a fluid and a weir (overflow dam (30)) positioned to define a level of the fluid, a second vessel (32) disposed around the first vessel to receive the fluid flowing over the weir, a support (12) positioned to carry the wafer into contact with the fluid and a reservoir (not shown, source of feed 22) configured to carry the fluid.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the apparatus of Harada et al to use the conventional electroless processing station of Hongo et al because the electroless processing station forms a more uniform thickness of the plated material.

11. Claims 8 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,700,127) in view of Kinnard et al (US 6,663,333) as applied to claims above and further in view of Thompson et al (US 5,168,886).

The teachings of Harada et al and Kinnard et al are described above.

Harada et al teach (see paragraph spanning cols. 4 and 5) that the processing stations other than the disclosed reactor are conventional in the art for applying complementary processing steps on the microelectronic workpieces.

Hence, Harada et al does not teach the details of a conventional processing station being an spray station with a fluid manifold.

However, Thompson et al teach (see figures 4-5 and related description at col. 3, lines 8-41) a station that included a vessel (not shown) configured to store a liquid, a support configured to carry the wafer and a fluid manifold being coupled to the vessel

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and having a plurality of fluid jets directed toward the support to spray the wafer with the fluid.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the apparatus of Harada et al to use the conventional spray station of Thompson et al because the spray station of Thompson et al was an economic improvement over prior spray stations by processing a single wafer at a time.

12. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,700,127) in view of Kinnard et al (US 6,663,333) as applied to claims above and further in view of Ono et al (US 5,378,145).

The teachings of Harada et al and Kinnard et al are described above.

Harada et al teach (see figure 1) the apparatus substantially as claimed.

Regarding claim 14, Harada et al teach the processing stations are disposed on either side of the robotic transfer device.

Ono et al teach (see figure 1) arranging processing stations in a single line to one side of a robotic transfer device.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the apparatus of Harada et al to have the processing stations in a single line to one side of the robotic transfer device of Harada et al so that the apparatus could be placed along a wall in order to maximize floor space in the processing room.

In addition, it would have been obvious to one of ordinary skill in the art to have made the processing stations manually accessible as taught by Ono et al (antistatic

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door 124) from a single side so that the processing stations could be accessed for maintenance.

13. Claims 15 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,700,127) in view of Kinnard et al (US 6,663,333) as applied to claims above and further in view of Zila et al (US 5,731,678).

The teachings of Harada et al and Kinnard et al are described above.

Harada et al teach (see figure 1) the apparatus substantially as claimed.

However, Harada et al do not teach the processing stations had a support positioned proximate to the processing station having two transferring positions, one to receive the workpiece from the transfer device and the other to receive the workpiece manually.

Zila et al teach a support for a processing station that had two transferring positions, the first being for accepting the workpiece from a robot and the second being for accepting the workpiece manually.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the apparatus of Harada et al to have the workpiece support of Zila et al at the processing stations so that the workpieces could be manually accessed.

14. Claims 1-32 and 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,700,127) in view of Woodruff et al (US 2001/0043856) (for all claims) and further in view of (1) Applicant's admission of prior art (for claims 2-5, 7, 9-11, 18-20, 22, 23 and 29-32), (2) Hongo et al (US 6,716,330)

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(for claim 6), (3) Thompson et al (US 5,168,886) (for claims 8 and 24), (4) Ono et al (US 5,378,145) (for claim 14) and (5) Zila et al (US 5,731,678) (for claims 15 and 26).

In the interest of avoiding redundancy, please see above for the teachings of Harada et al, Applicant's admission, Hongo et al, Thompson et al, Ono et al and Zila et al.

All claims are rejected as obvious as applied above, with the exception of replacing the Kinnard et al reference with Woodruff et al which teaches a transfer device having first and second end effectors that are rotatable relative to the other about a common axis. It would have been obvious to one of ordinary skill in the art to have used the transfer device of Woodruff et al because the double end effectors would have allowed for faster processing of workpieces.

[This rejection is made in addition to the obviousness-type double patenting rejection made below because the PGPub of the below patent is eligible as prior art against the present invention under 35 USC 102(a).]

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 1-32 and 57-60 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of U.S. Patent No. 6,752,584 in view of Harada et al (US 5,700,127) (for all claims) and further in view of (1) Applicant's admission of prior art (for claims 2-5, 7, 9-11, 18-20, 22, 23 and 29-32), (2) Hongo et al (US 6,716,330) (for claim 6), (3) Thompson et al (US 5,168,886) (for claims 8 and 24), (4) Ono et al (US 5,378,145) (for claim 14) and (5) Zila et al (US 5,731,678) (for claims 15 and 26).

In the interest of avoiding redundancy, please see above for the teachings of Harada et al, Applicant's admission, Hongo et al, Thompson et al, Ono et al and Zila et al.

All claims are rejected upon obviousness-type double patenting as applied above, with the exception of replacing the Kinnard et al reference with claims 1-16 of US Patent No. 6,752,584 which teach a transfer device having first and second end effectors that are rotatable relative to the other about a common axis. It would have been obvious to one of ordinary skill in the art to have used the transfer device of the claims of the '584 patent because the double end effectors would have allowed for faster processing of workpieces.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

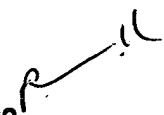
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Examiner
Art Unit 1742

hdw


ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700